

भारतीय मानक
साईकिल — हब असेम्बली — विशिष्टि
(तीसरा पुनरीक्षण)

Indian Standard
BICYCLE — HUB ASSEMBLY — SPECIFICATION
(*Third Revision*)

ICS 43.150

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Bicycles Sectional Committee had been approved by the Transport Engineering Division Council.

Bicycle hub assemblies were earlier covered under two standards, namely IS 629 : 1988 'Specification for bicycle hub assembly—R Type' and IS 12205 : 1988 'Specification for bicycle hub assembly — PH Type'. As a result of experience gained by the manufacturers of bicycles, many other forms of hubs have evolved over a passage of time. This revision is being taken up to amalgamate IS 12205 with IS 629 and to include other type of hubs being used in bicycle industry, since most of the requirements of all types of hubs are same. After the publication of this standard IS 12205 shall be withdrawn.

In the formulation of this standard, assistance has been derived from the following Japanese Industrial Standard:

JIS D 9419 : 1996 Bicycle hubs

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BICYCLE — HUB ASSEMBLY — SPECIFICATION

(Third Revision)

1 SCOPE

This standard covers the dimensions and other requirements of bicycle hub assemblies (front and rear).

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of the standards. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
513 : 2008	Cold reduced low carbon steel sheet and strip (<i>fifth revision</i>)
734 : 1975	Specification for wrought aluminium and aluminium alloy forging stock and forgings (for general engineering purposes) (<i>second revision</i>)
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (<i>third revision</i>)
1079 : 1994	Hot rolled carbon steel sheets and strips — Specification (<i>fifth revision</i>)
1572 : 1986	Specification for electroplated coatings of cadmium on iron and steel (<i>second revision</i>)
1573 : 1986	Specification for electroplated coatings of zinc on iron and steel (<i>second revision</i>)
2039 (Parts 1 to 3) : 1991	Steel tubes for bicycle and cycle rickshaws — Specification (<i>second revision</i>)

IS No.	Title
2062 : 2006	Hot rolled low, medium and high tensile structural steel (<i>sixth revision</i>)
2500 (Part 1) : 2000	Sampling procedure for inspection by attributes: Part 1 Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (<i>third revision</i>)
4218	ISO General purpose metric screw threads:
(Part 1) : 2001	Basic profile (<i>second revision</i>)
(Part 3) : 1999	Basic dimensions (<i>second revision</i>)
15184 : 2002	Bicycles — Steel balls — Specification

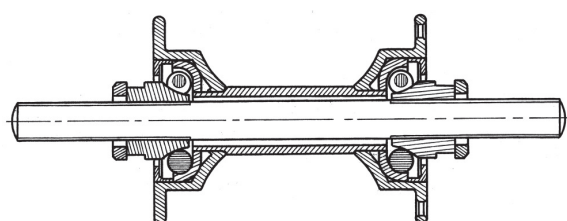
3 CLASSIFICATION

3.1 Hubs shall be classified in accordance with shape of the barrel as described in Table 1 and Fig. 1 to Fig. 4.

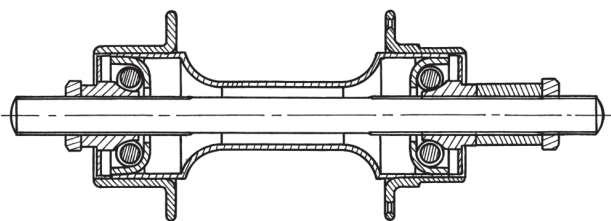
Table 1 Classification of Hubs

Sl No. (1)	Type of Hub (2)	Use (3)
i)	Thin barrel hub	Front wheel Rear wheel
ii)	Thick barrel hub	Front wheel Rear wheel
iii)	Oval barrel hub	Front wheel Rear wheel
iv)	Parallax barrel hub	Front wheel Rear wheel

3.1.1 Rear hubs shall be suitable for single speed or multiple speeds as per the configuration of the bicycle.



1A Thin Barrel Front Hub



1B Thin Barrel Rear Hub

FIG. 1 THIN BARREL HUBS

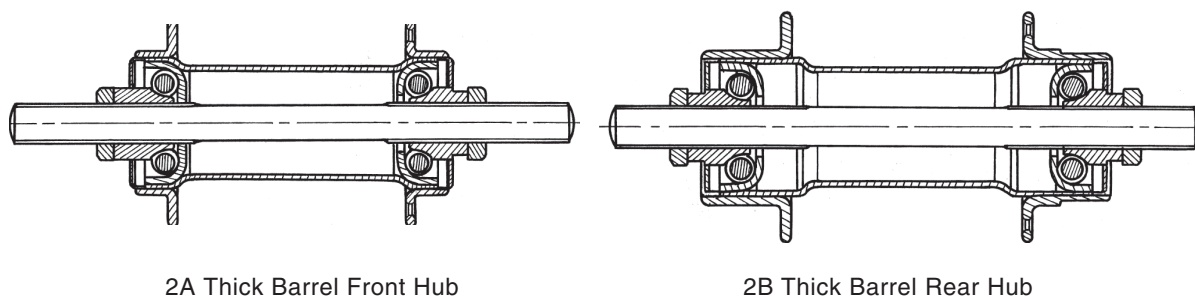


FIG. 2 THICK BARREL HUBS

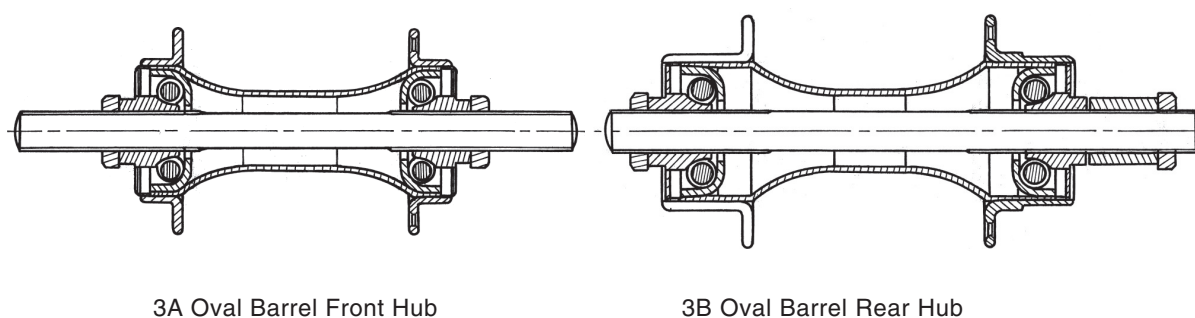


FIG. 3 OVAL BARREL HUBS

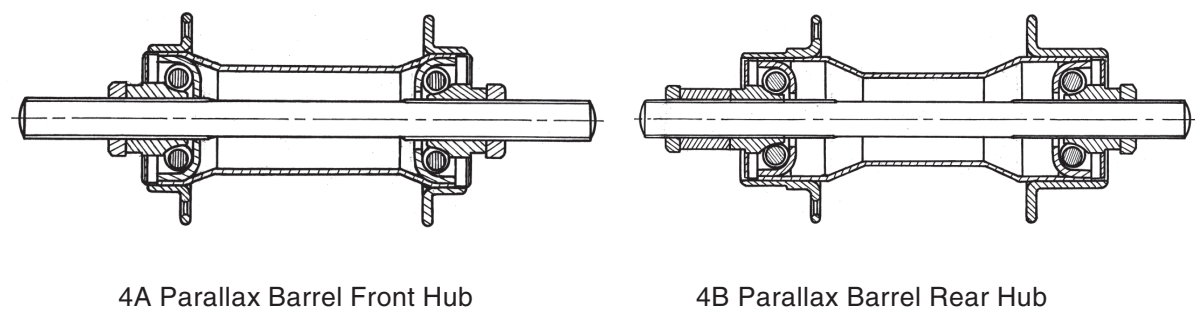


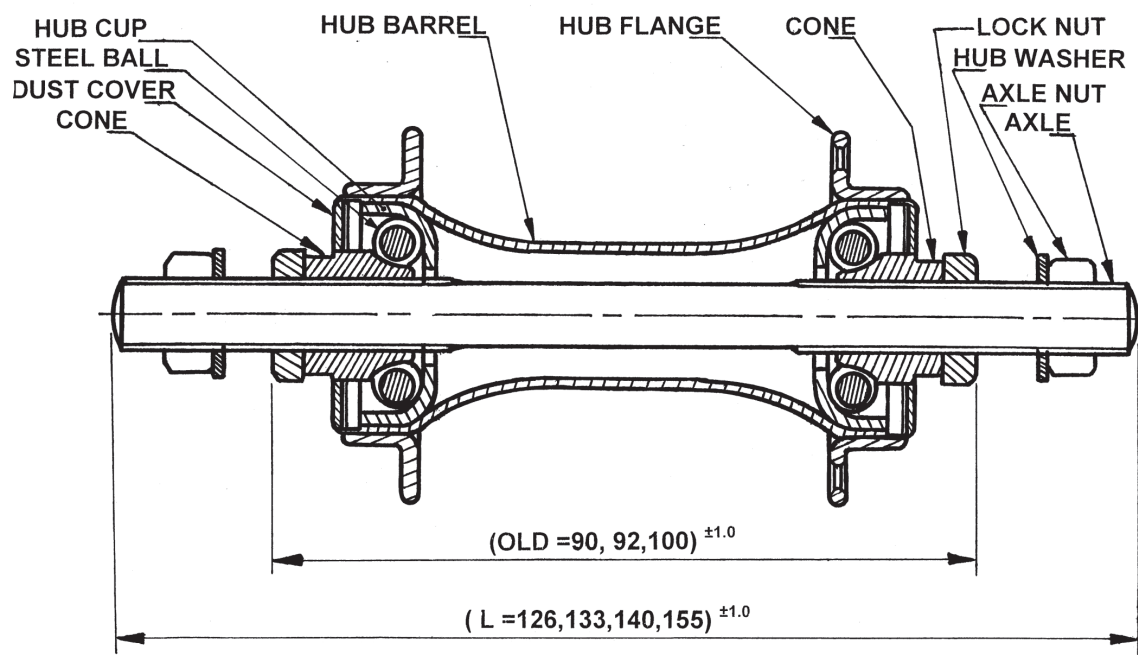
FIG. 4 PARALLAX BARREL HUBS

4 DIMENSIONS

4.1 Front Hub Assembly

Details of various components of front hub, axle dimensions and dimensions (OLD) across lock nuts to lock nuts over cones on both ends shall be as described in Fig. 5. The dimensions of most popular type of front hub assemblies shall be as per Table 2 and Fig. 5.

The overall lengths of axle must be chosen in accordance with the number and type of accessories required to be mounted on the axle. The dimension (OLD) across lock nuts to lock nuts over cones on both ends must be in accordance with the type of bicycle/ its number of speeds.



All dimensions in millimetres.

FIG. 5 COMPONENTS OF FRONT HUBS

Table 2 Front Hub Axle Thread Size 'D'
(Clause 4.1)

Sl No.	Type of Hub Axle	Type of Threads	
		Popular BSCY	Alternate Metric as per IS 4218 (Parts 1 and 3)
(1)	(2)	(3)	(4)
i)	Thin barrel	5/16 BSCY \times 26TPI	M8 \times 1P
ii)	All other hubs	3/8 BSCY \times 26TPI	M10 \times 1.25P

NOTES

- 1 Thin barrel front hub with 5/16" \times 133 long hub axle and 90 mm OLD is popular R-Type hub.
- 2 Thick barrel front hub with 3/8" \times 140 long hub axle and 92 mm OLD is popular PH-Type hub.

4.2 Rear Hub Assembly

Details of various components of rear hub, axle dimensions and dimensions (OLD) across lock nuts to

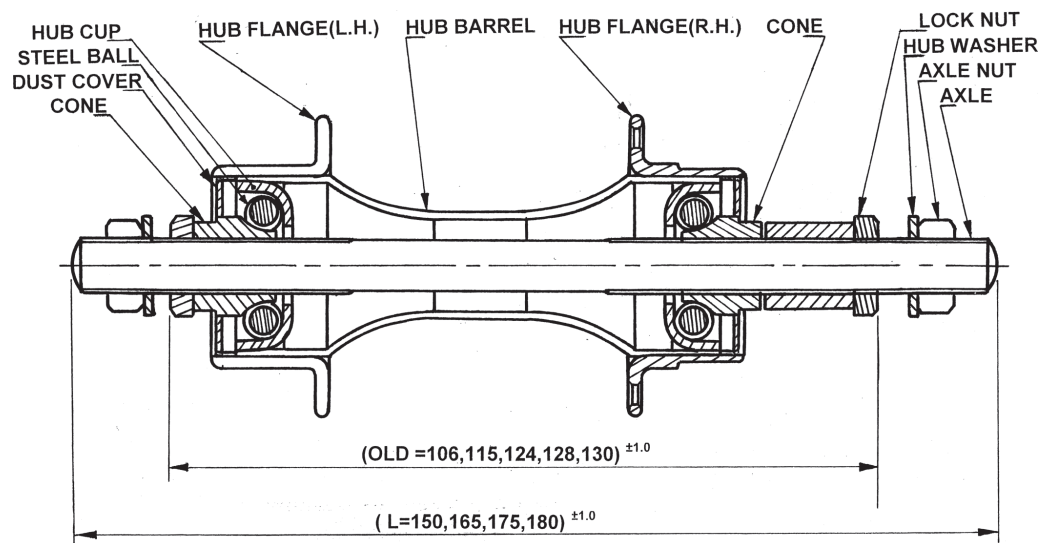
lock nuts over covers shall be as described in Table 3 and Fig. 6.

Table 3 Rear Hub Axle Thread Size 'D'
(Clause 4.2)

Popular BSCY	Alternate Metric as per IS 4218 (Parts 1 and 3)
(1)	(2)
3/8 BSCY \times 26TPI	M10 \times 1.25P

NOTES

- 1 Thin barrel rear hub 3/8" \times 165 long hub axle and 106 mm OLD is popular R-Type hub.
- 2 Thick barrel rear hub 3/8" \times 165 long hub axle and 106 mm OLD is popular PH-Type hub.

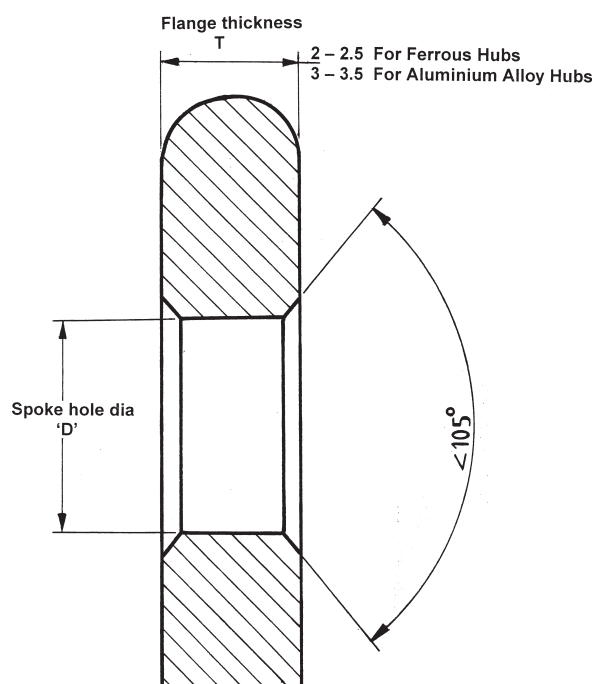


All dimensions in millimetres.

FIG. 6 COMPONENTS OF REAR HUBS

4.3 Spoke Holes

Details of spoke holes shall be as per Table 4 and Fig. 7.



All dimensions in millimetres.

FIG. 7 HUB FLANGE DETAILS

Table 4 Spoke Holes

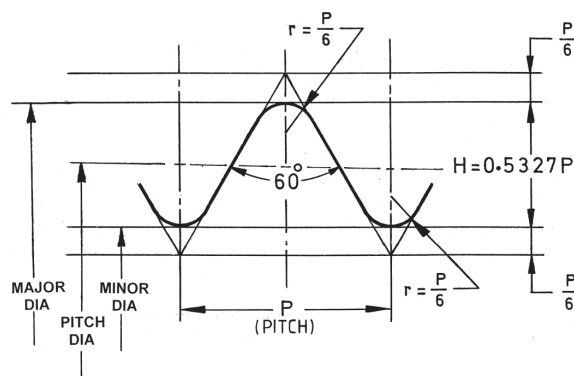
(Clause 4.3)

All dimensions in millimetres.

Sl No.	Type of Hub	No. of Spoke Holes in Each Flange	Spoke Hole Diameter 'D'	Compatible Spoke Diameter
(1)	(2)	(3)	(4)	(5)
i)	Front hub	8, 10, 14, 16 and 18	2.5	2.032
			2.8	2.336
			3.0	2.642
			3.6	3.251
ii)	Rear hub	8, 10, 14, 18, 20 and 32	2.5	2.032
			2.8	2.336
			3.0	2.642
			3.6	3.251

4.4 Screw Threads

The screw thread dimensions shall be as per Table 5 and Fig. 8



All dimensions in millimetres.

FIG. 8 FORM OF THREADS

Table 5 Sizes of Threads

(Clause 4.4)

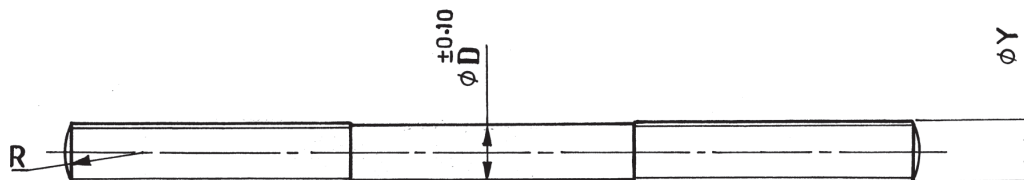
All dimensions in millimetres.

Sl No.	Size	Pitch <i>P</i>	Popular BSCY												Alternate Metric	
			External Threads						Internal Threads							
			Major Diameter		Pitch Diameter		Minor Diameter		Major Diameter	Pitch Diameter		Minor Diameter		Thread Size	Ref to IS Standard	
			<i>Max</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
i)	7.94 × 0.98	0.977	7.938	7.798	7.417	7.325	6.896	6.706	7.938	7.508	7.417	7.192	6.896	M8 × 1P	IS 4218 (Part 3)	
ii)	9.52 × 0.98	0.977	9.525	9.380	9.004	8.908	8.484	8.288	9.525	9.101	9.004	8.781	8.484	M10 × 1.25P		
iii)	34.80 × 1.06	1.058	34.798	34.620	34.234	34.107	33.670	33.442	—	—	—	—	—	M35 × 1P	IS 4218 (Part 1)	

4.5 Hub Axle

The dimensions of Hub axle shall conform to Table 6 and

Fig. 9



All dimensions in millimetres.

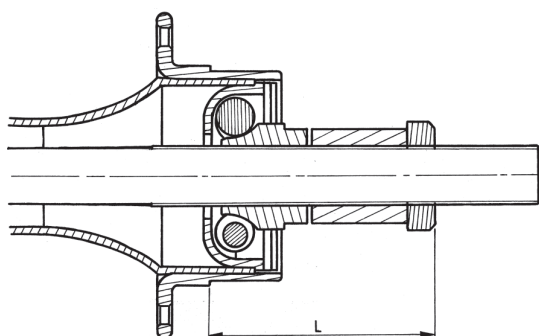
FIG. 9 HUB AXLE DIMENSIONS**Table 6 Sizes of Hub Axle Threads**

(Clause 4.5)

All dimensions in millimetres.

Sl No.	Ø 'D'	Popular BSCY			Alternate Metric as per IS 4218 (Part 3)
		Thread Size 'Y'	Major Diameter	Minor Diameter	Thread Size 'Y'
(1)	(2)	(3)	(4)	(5)	(6)
i)	7.25	5/16 BS CY × 26 TPI	7.863/7.758	6.798/6.693	M 8 × 1P
ii)	8.8	3/8 BS CY × 26 TPI	9.450/9.345	8.460/8.280	M 10 × 1.25P

4.6 The dimension between freewheel stopping face and right hand side lock nut over cone for multi speed rear hub assemblies shall be as per Fig. 10.



No. of Speeds	'L' mm
7	38-39
6	36-37
5	33.5-37

FIG. 10 FREEWHEEL LOCATION DIMENSIONS

5 MATERIALS

5.1 The materials for various components shall conform to the following relevant Indian Standards:

<i>Component</i>	<i>Conforming to</i>
Hub flange	IS 513 or IS 1079 or any suitable die cast/forged alloy
Hub barrel	IS 2039 or any suitable die cast/forged alloy
Hub axle	IS 2062
Integral hub, barrel and flange	IS 734 Aluminium alloy of Designation 65032 (Condition WP)
Ball race (Hub cup)	Grade 'O' or 'D' of IS 513 or IS 1079 or IS 2062 or any alloy steel suitably heat treated
Hub cones, lock nuts for cones, Axle nuts	IS 2062
Steel balls	IS 15184

5.2 Case hardening of ball race (hub cup) and hub cone shall be 600 HV to 800 HV (with 5 kgf load) and case depth shall be 0.3 mm, *Min.*

6 MANUFACTURE

6.1 The spoke holes on the right and left flanges shall be located as alternatively deviated each half the pitch (*see* Fig. 11). The spoke holes shall be alternatively chamfered on both sides of each flange for easy fitting of spoke. Spoke holes in hubs made from non-ferrous materials need not be chamfered.

6.2 The hub assemblies shall be properly lubricated. The manufacture of hubs shall be such as to prevent access of foreign matter inside the hubs.

6.3 For the hubs of which any parts are integrated by joining or press fit, each connection shall withstand a torque of not less than 100 kg-cm (10 Nm) for front hubs and 350 kg-cm (35 Nm) for rear hubs. This condition does not apply to hub cups fitted in hub flanges.

6.4 Threads on the flange of Rear Hubs shall have suitable under-cut to provide tool relief during threading operation.

7 FINISH

7.1 The hub axle shall have a smooth finish and shall be auto blackened or zinc plated, to Service Grade No. 2 (Classification No. Fe/Zn 7.5) of IS 1573.

7.2 The inside of ball races (hub cup) shall be finished smooth to ensure free running of balls.

7.3 The hub cones shall be smooth self-finished or chemically colored or zinc plated to Service Grade No. 1 (Classification Fe/Zn 5) of IS 1573. It shall meet the requirements of Grade 1 of IS 1573.

7.4 The lock nuts for cones shall be auto blackened or chemically colored or zinc plated to Service Grade No. 1 (Classification Fe/Zn 5) of IS 1573. It shall meet the requirements of Grade 1 of IS 1573.

7.5 The hub axle nut shall be nickel-chrome plated to 'Service Condition No. 1' (Classification No.

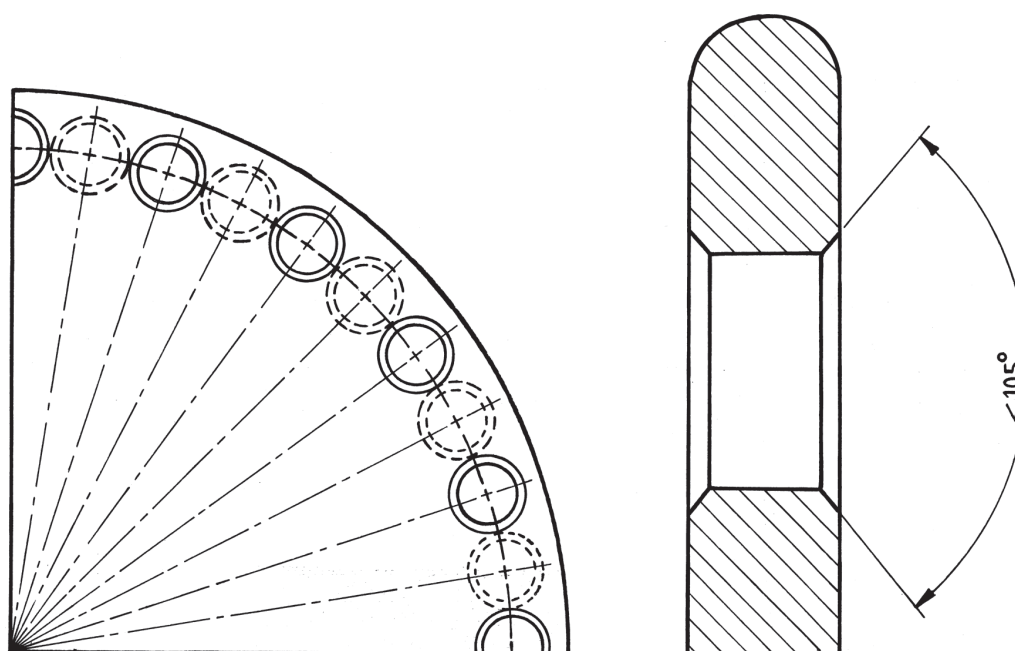


FIG. 11 HUB FLANGE SIDE VIEW

Fe/Ni 10b Cr r) of IS: 1068 or zinc plated to 'Service Grade No. 2' (Classification No. Fe/Zn 7.5) of IS 1573 or cadmium plated to 'Service Grade No. 2' (Classification No. Fe/Cd 8) of IS 1572 or shall be chemically coloured.

7.6 The hub body comprising of hub barrel, hub flanges and hub cups shall be nickel and chromium plated and electroplated coatings shall conform to 'Service Condition No.1' with designation Fe/Ni 10b Cr r of IS 1068 with the provision that *p*-or *d*-nickel and *mc* or *mp*-chromium may be substituted for *b*-nickel and *r*-chromium, respectively. The minimum thickness of coating shall be 10 µm in case of nickel and 0.3 µm in case of chromium. Alternately these components may be powder coated.

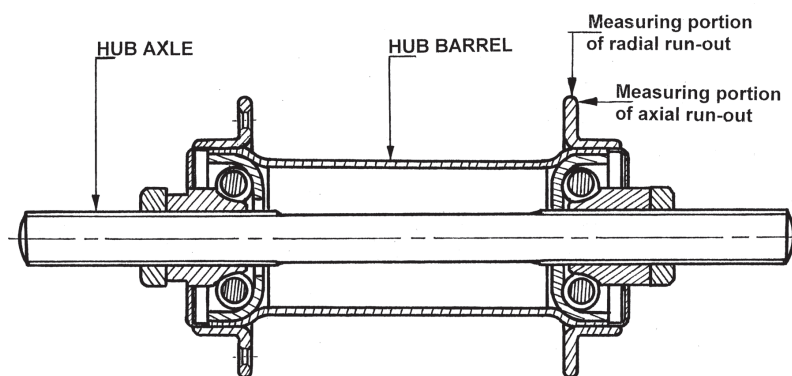
NOTE — In view of the shape of this component a uniform thickness of plating could be expected. In order to ensure that the thickness of plating at any place is not less than specified, an approximately higher plating thickness would have to be aimed at.

8 PERFORMANCE

8.1 The rotation of hubs shall be smooth, and there shall be no visible plays between the hub axle and the hub body.

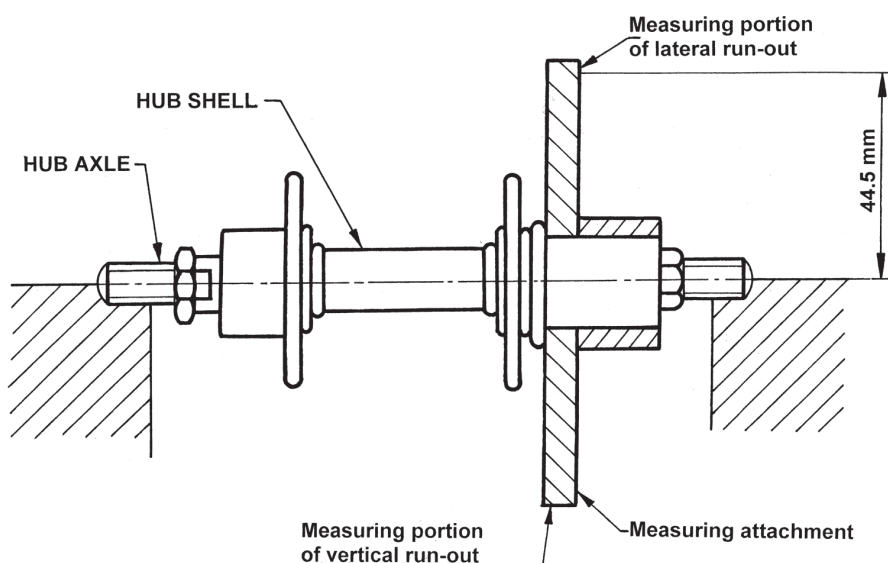
8.2 For front hubs, the radial run-out at the flange periphery and axial run-out at a position between the flange periphery and the spoke hole, measured while fixing the hub axle and the hub shell is rotated as shown in Fig. 12 shall not exceed 0.4 mm and 0.5 mm, maximum respectively at the measuring portions.

8.3 For rear hubs, the radial run-out at the flange periphery and axial run-out at a position between the flange periphery and the spoke hole, measured while fixing the hub axle and the hub shell is rotated as shown in Fig. 13, shall not exceed 0.4 mm, maximum and 0.5 mm, maximum respectively at the measuring portions, respectively



All dimensions in millimetres.

FIG. 12 AXIAL AND RADIAL RUN-OUT MEASUREMENT OF FRONT HUBS



All dimensions in millimetres.

FIG. 13 AXIAL AND RADIAL RUN-OUT MEASUREMENT OF REAR HUBS

8.4 Coaxial difference between the outer circumference axis and the thread hole axis of hub cone, measured as shown in Fig. 14, shall not exceed 0.3 mm.

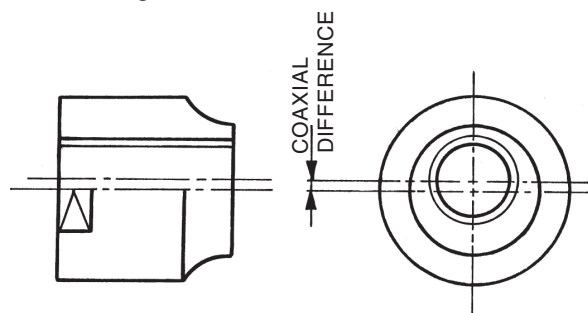


FIG. 14 COAXIAL DIFFERENCE BETWEEN THE OUTER CIRCUMFERENCE AXIS AND THE THREAD HOLE AXIS OF HUB CONE

8.5 For rear hubs, when the rear axle is fixed, and the hub body, loaded with a mass of 120 kg is rotated for 40 000 revolutions at a rate of 250 cycles/min, there shall be no flaking, visible wearing, or other harmful defects on the ball races or other parts contacting surfaces.

9 MARKING

9.1 Each hub assembly shall be marked with manufacturer's name, initials or recognized trade-mark.

9.1.1 The packing shall bear the marking of 'Country of origin'.

9.2 BIS Certification Marking

Each hub assembly may also be marked with BIS Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards.

10 PACKING

Each hub assembly shall be packed as per the best prevalent trade practices.

11 SAMPLING

11.1 Unless otherwise agreed to between the supplier and the purchaser, the procedure given in IS 2500 (Part 1) shall be followed for sampling inspection.

11.1.1 For dimensions, finish and workmanship; inspection Level IV and acceptable quality limit (AQL) 2.5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) shall be followed.

11.1.2 For tests, inspection Level 1 and acceptance quality limit (AQL) 2.5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) shall be followed.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002

Telephones : 2323 0131, 2323 3375, 2323 9402

Website: www.bis.org.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
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